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ABSTRACT

Projections of U.S. public elementary and secondary school enrollments and teacher supply and demand for 1978-86 are summarized in this report. Where possible, the grade retention method is used; otherwise projections are based on three alternate fertility rate estimates. Enrollments in elementary schools have decreased since 1970 to 47.8 million in 1978 and are expected to decrease further to 44.5 million by 1983 and 1984. Starting in 1985, enrollments are expected to increase gradually. The most likely K-8 enrollment projection indicates that K-8 enrollment will decrease to a low of 29.9 million in 1985. Enrollment in grades 9-12 is expected to decrease to 13.2 million in 1986. If an intermediate estimate of pupil/teacher ratio is correct, the number of unemployed teachers should decrease slightly from 2.4 million in 1978 to 2.3 million in the early 1980s before climbing back to 2.4 million in 1985. Decreases in elementary enrollment have not always resulted in corresponding decreases in need for elementary school teachers because of decreases in pupil/teacher ratios. Enrollment decreases in secondary schools, however, are likely to be accompanied by significant decreases in teachers employed. There should be more than enough teacher graduates in the reserve pool to ensure a teacher surplus through 1986. (Author/JM)

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Projections of Enrollments and Classroom Teacher Staffing in Elementary and Secondary Schools

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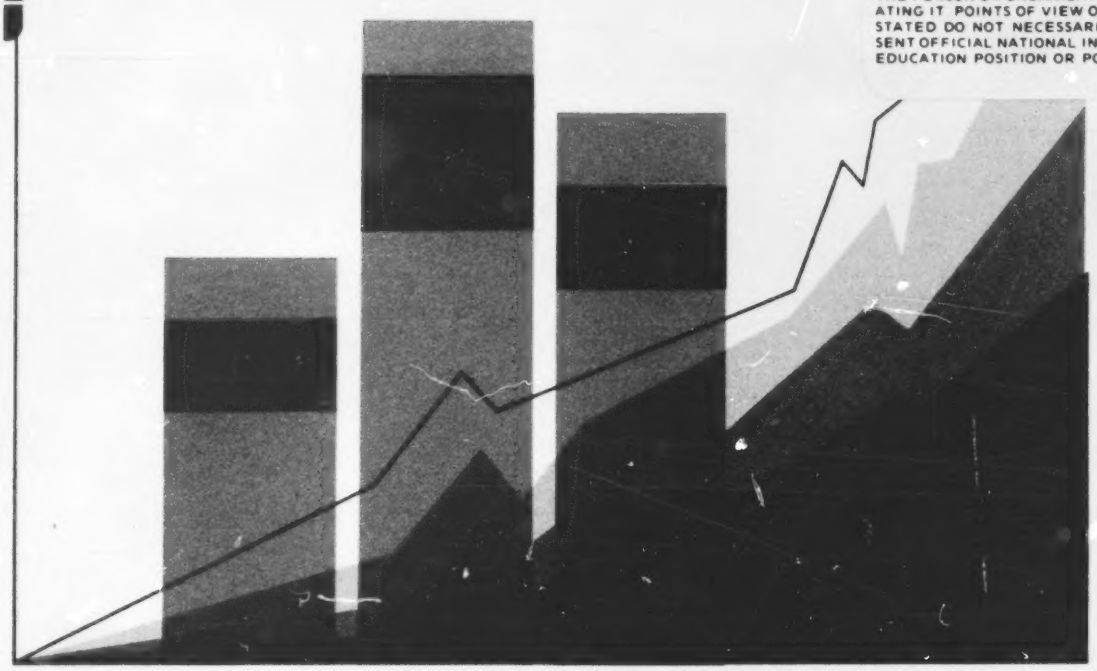

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Projections of enrollments and teachers in elementary and secondary schools are published biennially in the National Center for Education Statistics publication, Projections of Education Statistics. Data in this paper are based on the most recent issue, just published, containing projections to 1986-87.

Projections of enrollments in regular public elementary and secondary schools are computed by using a grade-retention method. This method depends mainly on assumptions about the entrance of 6-year-olds into the first grade and their subsequent progress through elementary and secondary school as determined by projected grade-retention rates.

The advantage of this method is that projections are based primarily on students who are already enrolled, especially for the beginning of the projection period. The projections not based on actual past enrollments are based on projections of the 6-year-old population. Six year-olds entering first grade through fall 1983 were already born when the latest population projections were made; therefore, the number is not dependent on assumed fertility rates. By 1986, the last year shown in the projections, only projections of kindergarten through grade 4 depend on assumed fertility rates.

Projections of the six-year-old population are obtained from the Bureau of the Census. Each component of population change (fertility, mortality and migration) is projected separately. The key assumption in this method is that of completed cohort fertility - the average number of births per woman upon completion of childbearing. The Bureau of the Census uses the following three assumptions of ultimate completed cohort fertility in their three projection series: Series I - 2.7 children per woman, Series II - 2.1 children per woman, and Series III - 1.7 children per woman.

The NCES cohort-survival method of projecting enrollments in public elementary and secondary schools has been used since 1966 with considerable success.

However, there is one major disadvantage to this method. It is that most projections are based on the last year of reported data. As a result, if the last year of data contains significant errors, these errors will be reflected in the projections.

To guard against this and also to get some information that will be useful in projecting enrollment in nonpublic schools, an age-specific enrollment rate model will also be used to project the total of public and nonpublic enrollment.

Enrollments in regular elementary and secondary schools increased from 33.9 million in 1954 to a peak of 51.3 million in 1970. Since then, enrollments decreased to an estimated 47.8 million in 1978 and are expected to decrease further to 44.5 million by 1983 and 1984. Starting in 1985, enrollments are expected to increase gradually. These past and projected enrollment decreases reflect the sharp decreases in the number of births since 1960--from 4.3 million in 1960 to 3.3 million in 1977.

Enrollment in grades K-8 increased from 26.7 million in 1954 to 36.8 million in 1969, an increase of about 10 million students in 15 years. However, the sharp decreases in the number of births in the 1960's began to be reflected in K-8 enrollments in the early 1970's. By 1978, K-8 enrollments have already dropped to 32.4 million, a drop of 4.4 million students in a steady downward trend over a 9-year span.

One result of this decrease has been the closing of many elementary schools in some parts of the Nation during the past few years. Undoubtedly, some of the closed schools were built to accommodate the 10 million additional students who enrolled in elementary schools during the 1950's and 1960's.

Enrollment projections for K-8 based on series II population projections show that continued enrollment decreases are expected through 1983, to be followed by gradual increases. By 1983 a further decreased of over 1 million students from the 1978 level will bring the enrollment level in the elementary grades down to 31.2 million, about the same level as 1959. By 1986 the enrollment in these grades should be back over 32 million.

The series II population projection is based on an ultimate completed cohort fertility rate of 2.1 births per woman, which represents replacement level. Replacement-level fertility is that required for a population to replace itself indefinitely, given projected mortality rates and the absence of net migration. The 2.1 birth per woman is also compatable with the most recent birth expectation data. The low alternative K-8 enrollment projections are based on series III population projections.

The high alternative K-8 enrollment projection is based on the series I population projections. This projection shows decrease from 32.4 million in 1978 to a low of 31.4 million in 1981 before increasing to 34.9 million in 1986. This represents a projection for 1986 of 2.8 million students more than the series II projection of 32.0 million. However, the series I population projection is based on the assumption of an ultimate completed fertility rate of 2.7 births per woman. In light of the most recent birth and birth expectation data, it is unlikely that the birth level required to meet series I population projections will be closely approached.

A more likely alternative is the low alternative K-8 enrollment projection, which is based on the series III population projection. The low alternative projection shows the enrollment decline in elementary schools continuing to decrease from 32.4 million in 1978 to 29.9 million in 1985 before increasing slightly in 1986. Although the series III ultimate completed fertility assumption of 1.7 births per woman most closely agrees with the birth data for 1975-76, birth data from November 1976 through July 1978, along with the latest birth expectation data, indicate that the level will probably be closer to 2.1, the series II ultimate completed fertility rate.

Enrollment in grades 9-12, which increased from 7.2 million in 1954 to 15.6 million in 1977, decreased in the fall of 1978 to an estimated 15.5 million and is expected to decrease rapidly to 13.2 million in 1986 as the children, born in the low birth years of the late 1960's, progress through high school. There are no alternative 9-12 enrollment projections, since students enrolled in grades 9-12 through 1986 were already born when the latest population projections were made.

The projections indicate that many high schools in the U.S. will have to face the same problems of declining enrollments in the 1980's that many elementary schools are facing in the 1970's.

Classroom teacher statistics are projected separately for public and nonpublic elementary and secondary schools by dividing projections of enrollment by projections of pupil-teacher ratios. Enrollment projections based on series II population projections were used to compute projections of classroom teachers.

For public schools, three alternative projections of pupil-teacher ratios were developed to determine three alternative projections of the numbers of classroom teachers. The low alternative projection of classroom teachers is based primarily on the assumption that the ratio of enrollment to the number of teachers will follow the 1966 to 1976 straight line trend through 1986. The high alternative projection is based primarily on the assumption that the pupil-teacher ratio will equal the average of the high and low alternative projections of pupil-teacher ratios for each year. If the projected low pupil-teacher ratios do occur, then nearly 500,000 more teachers will be employed than the 1976 pupil-teacher ratio would indicate.

An important fact to keep in mind when working with these alternative projections of pupil-teacher ratios and classroom teachers is that high alternative projections of pupil-teacher ratios yield low alternative projections of classroom teachers and that low alternative projections of pupil-teacher ratios yield high alternative projections of classroom teachers.

If the low alternative pupil-teacher ratios are realized, at the estimated 1976-77 average annual salary for public classroom teachers of about $15,000, teachers salaries from 1976-77 through 1986-87 will cumulatively cost 36 billion 1976-77 dollars more than they would at the current pupil-teacher ratios. If the intermediate pupil-teacher ratios are realized, the additional cost for teachers' salaries from 1976-77 through 1986-87 will be 20 billion 1976-77 dollars.

The number of classroom teachers in regualr elementary and secondary schools has doubled from 1.2 million in 1954 to an estimated 2.4 million in 1978. If the intermediate projections of pupil-teacher ratios are attained, then the number to teachers should decrease slightly to just above 2.3 million in the early 1980's before climbing back to 2.4 million in 1985. If

pupil-teacher ratios remains at the 1976 levels, then the number of teachers probably will decrease to 2.2 million in the early 1980's before beginning a gradual increase in 1984. If pupilteacher ratios follow their 1966 to 1976 downward trend, then the number of teachers will increase to 2.7 million in 1986.

Decreases in the number of classroom teachers in elementary schools have been small despite significant enrollment decreases since 1971. Decreases in pupil-teacher ratios have offset the large enrollment decreases, and it is expected that future decreases in pupil-teacher ratios will also offset most of the future enrollment declines through the early 1980's.

Perhaps one of the reasons that decreases in the number of teachers in elementary schools have not corresponded to the enrollment decreases in these schools is that school boards often are unable to close underutilized public elementary schools. In many school districts, public elementary schools have tended to be neighborhood schools that have relatively small enrollments, compared to those of secondary schools. Since hardly any neighborhood wants its school closed, the closing of elementary schools and the consolidation of enrollments has proven to be a slow process. As a result, elementary teachers have often taught in classrooms of smaller than desirable sizes. Secondary schools, on the other hand, tend to have relatively large enrollments. Enrollments can be consolidated by merging classes without closing schools. Therefore, enrollment decreases in secondary schools are likely to be accompanied by significant decreases in the number of teachers employed in these schools.

Although pupil-teacher ratios in secondary schools will probably continue to decrease gradually, the decreases are not expected to be enough to offset enrollment decreases.

By 1986, secondary schools are expected to employ about 123,000 fewer teachers than in 1978, partially reflecting the expected decrease of 3.0 million students over the same period.

The total demand for additional elementary and secondary school teachers (not employed in schools the previous year) includes those needed to allow for enrollment changes, for lowering pupil-teacher ratios and for replacement of teachers leaving the profession (turnover). During the 5-year period fall 1967 to fall 1971, the cumulative demand for additional public school teachers (including returnees to the profession) was estimated at 1,121,000. During the next 5-year period (1972 to 1976), the total cumulative demand for additional teachers was estimated to have dropped to 857,000. For the 5-year period we are now in (1977 to 1981) the demand for additional teachers is expected to decrease further to 629,000; it is expected to increase to 816,000 for the following 5-year period, 1982 to 1986. Therefore, over 1.4 million new teachers or returnees to the profession are expected to be hired during the 10 year period, 1977 to 1986. This is about 530,000 fewer teachers than were hired during the preceding 10 years, 1967 to 1976.

The number of teachers necessary to take care of enrollment changes and pupil-teacher ratio changes was computed for each year as the difference between the total employed for the current year and the total employed for the previous year. The number for turnover for the years 1967-1971 was based primarily on the assumption that 8 percent of the total classroom teachers had left the profession either temporarily or permanentely each year.

Eight percent is the historical turnover rate in public schools. However, enrollment decreases combined with increased numbers of college graduates

prepared to teach in the early 1970's led to significant changes in the job market for teachers. As a result, from 1972 on a teacher turnover rate of 6 percent has been used.

Projections of the demand for additional teachers based on an 8 percent high alternative turnover rate and a 4.8 percent low turnover rate is a theoretical floor for the turnover rate, based on estimates of death, retirement, child bearing and raising, and administrative promotions only.

The supply of additional teachers consists of new teacher graduates and former teacher graduates who were not employed as teachers in the previous year. New teacher graudates are those graduates of institutions of higher education in a given year who are prepared to teach. Former teacher graduates are those who graduated from institutions of higher education in preceding years and were prepared to teach, but who did not hold teaching positions in the previous year. Some of these former teacher graduates are former teachers; the remainder have never been employed as teachers.

Data on new teacher graduates have been collected by the National Education Association for many years. The number of new teacher graduates increased from 220,000 in 1967 to 317,000 in 1972. Since 1972, the number has decreased each year, reaching an estimated 211,000 in 1978 (low alternative supply projections). Undoubtedly, the decrease in the number of new teacher graduates is in part the result of the publicity that the surplus of teachers has received since the early 1970's. However, a recent study of college graduates carried out by the National Center for Education Statistics indicates that in May 1976, the underemployment rate for education graduates in 1974-75 was lower than the average for all college graduates that year. Underemployed college graduates

are defined as those not working in an occupation for which their credentials would seem to qualify then and who reported that, in their opinion, their job does not require a college degree. The underemployment rate for education graduates was about the same as graduates in biological sciences, physical sciences and mathematics, and much lower than the rates for graduates in psychology, social sciences and humanities. Only graduates in engineering and health professions had considerably lower underemployment rates than education graduates.

Of course not all new teacher graduates actively seek teaching jobs, but the Survey of 1974-75 College Graduaate indicates that 77 percent of teacher graduates in 1974-75 sought teaching positions in 1975-76 and that 25 percent of these graduates were still seeking teaching jobs in May 1976.

In recent years, some projections of the supply of new teacher graduates have shown drastic decreases. These projections have been based on data which showed very steep decreases in the intentions of entering college freshmen to seek careers in education. Although decreases in the number of new teacher graduates have been significant, they have not been nearly as severe as those projected on the basis of freshmen intention data. This is not entirely unexpected, since there always has been doubt as to how closely freshmen intentions are reflected in actual fields of preparation 4 years later.

The projections made by NCES do not anticipate severe decreases in the number of new teacher graduates over the next 10 years. Information from the Survey of 1974-75 College Graduates indicates that in 1976 the job outlook for teachers was as good or better than for graduates in most other fields. Although the demand for additional teachers is expected to decrease further

over the 5 year period 1977 to 1981, it is unlikely that the percentage of bachelor's degree recipients prepared to teach will drop below 13 percent, the low alternative projection in 1986.

Projections of the supply of new teacher graduates are based on alternative assumptions about the percentage of the total number of bachelor's degrees granted that will go to new teacher graduates. The low alternative projection is based on the assumption that future percentages will follow the 1966 to 1976 downward trend through 1986. The high alternative projection is based on the assumption that the 1976 percentage will hold constant through 1986. The intermediate alternative projection is based on the assumption that the percentage of new teacher graduates on the base of all bachelor's degree recipients will equal the average of the high and low alternative projections.

The low alternative projection of the supply of new teacher graduates shows a decrease from 211,000 in 1978 to 133,000 in 1986. This represents a decrease from 21 percent of all bachelor's degree recipients to 13 percent. The intermediate alternative projection shows a decrease to 187,000 in 1986, 19 percent of all bachelor's degrees granted. The high alternative supply projection shows a slight increase to 241,000 in 1986, 24 percent of all bachelor's degrees granted.

The supply of new teacher graduates constitutes only part of the total supply of additional teachers. The remainder of teacher supply is referred to as the "reserve pool of teachers" and is defined as former teacher graduates who are currently not employed as teachers. Each of these persons falls into one of the following labor force categories: (1) unemployed; (2) in the labor reserve; (3) employed in a non-teaching job;

and (4) never actively sought employment.

Only very limited data exist on which to base rough estimates of 2 of these 4 components. In 1970 there were about 30,000 unemployed experienced teachers. Of course, some former teacher graduates who are not experienced are also unemployed. Considering the large surplus of teachers that has been produced since 1970, it seems reasonable to assume that the total number of unemployed former teacher graduates is now substantially larger than 30,000.

The other segment of the serve pool for which rough estimated can be made is the labor reserve. The labor reserve includes persons not in the labor force who were employed at some time during the past 10 years. The labor force includes persons who are either employed or unemployed. Based on data from the Bureau of the Census, the National Education Association estimates that there were about 640,000 former teachers in the labor reserve in 1976. Again this excludes former teacher graduates who never taught but who are in the reserve pool. Information on the number of former teacher graduates employed in non-teaching jobs and former teacher graduates who never sought employment is not available.

On the basis of the above limited information, an estimate of 1 million former teacher graduates in the reserve pool seems reasonable. Of course not all of these former teacher graduates are actively seeking teaching jobs. The National Education Association estimates that in 1976 about 120,000 of the 640,000 former teachers in the labor reserve were seeking employment.

In addition to these 120,000 former teachers, it is likely that some former teacher graduates in the reserve, who have never held teaching positions,

are seeking teaching positions as well. Therefore, in excess of 120,000 persons on the labor reserve portion of the reserve pool of teachers were actively seeking teaching positions in 1976. To this amount would have to be added most unemployed teachers, who by definition are actively seeking a job, although not necessarily a teaching job, And the portions of the two other categories in the reserve pool of teachers, former teacher graduates who have never before sought employment and former teacher graduates employed in non-teaching jobs, who are seeking teaching positions, would also have to be included. Therefore, it seems reasonable to estimated about 200,000 former teacher graduates in the reserve pool of teachers actively sought teaching positions in 1976.

Tnese charts show three alternative projections of the demand for additional teachers and three alternative projections of the supply of new teacher graduates. This comparison would be valid only if all additional teachers hired were new teacher graduates and all new teacher graduates sought teaching positions, but this is not the case. However, these charts are shown to give a rough indication of the general state of teacher supply and demand nationally.

The projections shown in this charts indicate that for the 5-year period, 1977 to 1981, the cumulative supply of new teacher graduates will exceed the cumulative demand for additional teachers. For the intermediate alternative assumptions for both supply and demand, the 5-year supply of new teacher graduates will exceed the total demand for additional teachers by nearly 500,000. Although not all new teacher graduates in the 5-year period, 1977 to 1981, will seek teaching positions (77 percent of the 1974-75 new teacher graduates sought teaching jobs in 1975-76), a large number of teachers in

the reserve pool will also be seeking teaching positions during this 5-year period--estimated at 200,000 in 1976. Since it is expected that many new teacher graduates in the years 1977 to 1981 will not be able to find teaching positions, the size of the reserve pool will probably increase during the period. Therefore, the total surplus of teacher for the years 1977 to 1981 will probably be considerably larger than the imbalances shown in this chart.

Comparing the low alternative supply projection with the high alternative demand projection for the 5-year period 1977 to 1981 still shows a surplus of 190,000 new teacher graduates over the total demand for additional teachers. The high alternative supply compared to the low alternative demand shows a surplus of 700,000.

During the following 5-year period (1982 to 1986) the surplus of new teacher graduates is expected to decrease, as the expected enrollment increases of the mid 1980's cause an increase in the numbers of teachers hired. The intermediate projections for both supply and demand show a surplus of new teacher graduates of 190,000 while the high supply projection and the low demand projections show a surplus of 540,000

Only the comparison of the low supply projection and the high demand projection shows a possible shortage of new teacher graduates. This possible shortage of 240,000 new teacher graduate to fill all jobs for additional teachers in the 5-year period, 1982 to 1986, is based on the assumptions that the teacher turnover rate during this period will average 8 percent and that new teacher graduates as a percentage of all bachelor's degree recipents will decrease from 24 percent in 1976 to 13 percent in 1986. These two assumptions

are optimistic from the point of view teacher graduates seeking teaching positions.

However, as mentioned earlier, the reserve pool, which was estimated to include 200,000 teachers seeking teaching positions in 1976, most likey will increase in size during the 5-year period, 1977 to 1981, when large surpluses of new teacher graduates are expected. Therefore, even if these favorable market conditions for new terachers do occur, there should be more than enough teacher graduates in the reserve pool to insure a surplus of teachers through 1986.